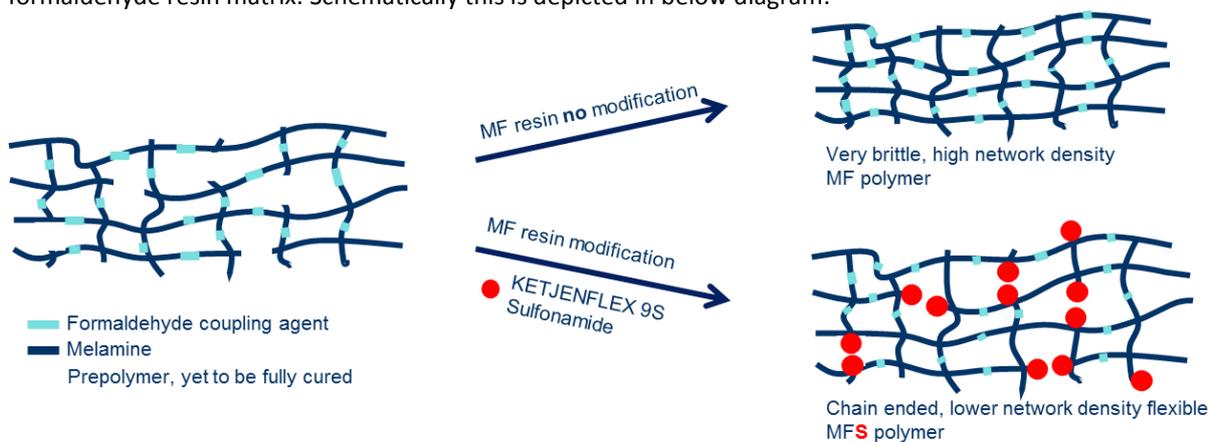


## KETJENFLEX® 9S in Melamine Formaldehyde Resins

Melamine Formaldehyde Resins find great use in the laminates industry. An important step in the chain of formaldehyde to the final laminated product is the modification of the resin. During the synthesis in the kettle internal and external modifiers may be added to influence the properties of the resin and the final laminate. KETJENFLEX® 9S is a sulfonamide based internal modifier that shall be reacted into the melamine formaldehyde resin matrix. Schematically this is depicted in below diagram:



The result of using KETJENFLEX® 9S internal modifier in a melamine formaldehyde resin can be summarized in:

### Improved resin stability

KETJENFLEX® 9S is positioned at the end of the polymer chain preventing the polymer from further curing at that location. As a result the resin has improved shelf life stability which can rise up to 2 months.

### Strongly improved post formability

Chain ending means the molecular weight and crosslink density is lower which results in more flexible resins also after curing. This is particularly important in post-formable laminates (HPL and CPL).

### Improved gloss of laminate

Resins modified with KETJENFLEX® 9S tend to show better flow and better impregnation of the paper. This results in glossy, colourless resin surfaces after pressing, moreover papers impregnated with such resins are non-hygroscopic.

### Maintained tensile strength of laminate

KETJENFLEX® 9S imparts good flow of the resin and reduced air entrapment which is good for the overall strength of the resin.



The information presented herein is true and accurate to the best of our knowledge, but without any guarantee unless explicitly given. Since the conditions of use are beyond our control, we disclaim any liability, including for patent infringement, incurred in connection with the use of these products, data or suggestions.

KETJENFLEX® is a registered trademark of Axcentive SARL

Europe, Americas, Middle East and Africa  
 Axcentive SARL  
 Chemin de Champouse  
 13320 Bouc Bel Air, France  
 Phone: +33 4 42 69 40 90  
 E-mail: [info@axcentive.com](mailto:info@axcentive.com)  
 Web: [www.axcentive.com](http://www.axcentive.com)

Asia, India and Australasia  
 Axcentive Asia Pte Ltd  
 13 Lorong 8 Toa Payoh, #07-01 Braddell Tech Park  
 319261 Singapore  
 Phone: +65 6258 6338  
 E-mail: [info@axcentive.com](mailto:info@axcentive.com)  
 Web: [www.axcentive.com](http://www.axcentive.com)

### Good steam and water resistance

As KETJENFLEX® 9S converts the hydrophilic methylol groups into hydrophobic toluene sulfonamide groups the resin becomes less water soluble and less hygroscopic.

### Zero leach out (chemically bound)

KETJENFLEX® 9S will be chemically bound into the resin matrix and can therefore never leach out. *Due to its high reactivity KETJENFLEX® 9S should be added at the end of the reaction after the resin has been left to cool down till 70°C.*

### Guide Recipe Melamine Resin for post-formable HPL

Ingredient	Amount
Formaline (44%)	310
Adjust pH at 9	
Melamine	346
Sorbitol	57
Heat with stirring to reflux-temperature. (approx. 92°C) Condense until the water-dilutability <sup>1)</sup> is 1 part of resin to 5 parts of distilled water at 25°C Cool down to approx. 70°C	
KETJENFLEX® 9S <sup>2)</sup>	38
Continue condensation at 70°C until a water-dilutability of 1 : 1 Cool down to room temperature as quickly as possible with addition of water	
Water	249
Total	1000

F/M ratio: 1.66

Solids: 57.7%

Use: Post-formable laminates HPL



Marble decorated post-formed HPL

The information presented herein is true and accurate to the best of our knowledge, but without any guarantee unless explicitly given. Since the conditions of use are beyond our control, we disclaim any liability, including for patent infringement, incurred in connection with the use of these products, data or suggestions.

KETJENFLEX® is a registered trademark of Axcentive SARL

Europe, Americas, Middle East and Africa  
Axcentive SARL  
Chemin de Champouse  
13320 Bouc Bel Air, France  
Phone: +33 4 42 69 40 90  
E-mail: [info@axcentive.com](mailto:info@axcentive.com)  
Web: [www.axcentive.com](http://www.axcentive.com)

Asia, India and Australasia  
Axcentive Asia Pte Ltd  
13 Lorong 8 Toa Payoh, #07-01 Braddell Tech Park  
319261 Singapore  
Phone: +65 6258 6338  
E-mail: [info@axcentive.com](mailto:info@axcentive.com)  
Web: [www.axcentive.com](http://www.axcentive.com)

1) The **water dilutability** is an off-line test performed as follows:

- Take a 10 g sample of the reaction mixture
- Add 10 g demineralized water and mix. If at 25 °C a permanent turbidity is formed, you have reached the cloud point. Water dilutability is then 1:1 (one part resin mixture versus one part water added).
- If no turbidity is formed add water in steps of 10 g and mix upon each addition of water. At the point where it becomes cloudy, the water dilutability is determined (if cloudy after addition of 50 g water then water dilutability is 1:5).

During the reflux the waterdilutability develops in the direction 1:10 > 1:5 > 1:1.

In order to know how long it takes from the start of the reflux before adding KETJENFLEX® 9S we suggest to measure the water dilutability at, for example, 5 times during the normal resin production (without KETJENFLEX® 9S). This should give a good indication of when you reach WD 1:5.

Once cooled down to 70 °C and after KETJENFLEX® 9S is added, continue to measure at distinct times the water dilutability, until you are close to a WD of 1:1. How long this takes is dependent on the installation, but should be relatively short. The effect of KETJENFLEX® 9S addition is a rapid decrease in water dilutability.

This gives the reference Melamine-Formaldehyde-Sulfonamide resin. On the basis of the above quantities of Formaline and Melamine, the solids content is about 50 %.

If there is the need, you can further optimize by varying the amount of KETJENFLEX® 9S and the end point (measured by the WD).

We believe the temperature of 70 °C for reflux with KETJENFLEX® 9S is already optimized.

2) At the point KETJENFLEX® 9S needs to be added the reactor should be opened. It is therefore important to cool down till 70 °C. Still at 70 °C some fumes may come out of the reactor. Worker safety is therefore important and we recommend to wear proper protection against possible inhalation of any fumes.